TESTING CERTIFICATE



CTK Co., Ltd.

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea Tel: +82-31-339-9970 Fax: +82-31-624-9501 Certificate No.: CTK-2015-00424 Page (1) / (33) Pages

1. Client

· Name: Cresyn Co., Ltd.

· Address: 5 Gangnam-daero 107-gil, Seocho-gu, Seoul, Korea

(137-702)

Date of Receipt: 2015-03-20

2. Manufacturer

Name : Cresyn Co., Ltd.

· Address: 5 Gangnam-daero 107-gil, Seocho-gu, Seoul, Korea

(137-702)

3. Use of Report: For FCC certification

4. Test Sample / Model: Wireless Active Noise Cancelling Headphones /

BT 330 NC

5. Date of Test: 2015-03-25 to 2015-04-06

6. Test Standard(method) used: FCC Part 15 Subpart B

7. Testing Environment: refer to 10 pages to 16 pages

8. Test Results: refer to 11 pages to 16 pages

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This Test Report cannot be reproduced, except in full.

	Tested by	Approved by
Affirmation		2
Ammation	Jang Bongjun: (Signature)	Song Youngkug: (Signature)
	EMC Test Engineer	Technical Manager

2015-04-14

Republic of KOREA CTK Co., Ltd.



Certificate No.: CTK-2015-00424 Page (2) / (33) Pages

REPORT REVISION HISTORY

Date	Revision	Page No
2015-04-14	Issued (CTK-2015-00424)	All
·	<u> </u>	

This report shall not be reproduced except in full, without the written approval of CTK Co., Ltd. This document may be altered or revised by CTK Co., Ltd. personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by CTK Co., Ltd. will constitute fraud and shall nullify the document.



Fax: +82-31-624-9501

Certificate No.: CTK-2015-00424 Page (3) / (33) Pages

TABLE OF CONTENTS

REPORT	REVISION HISTORY	2
1.0	General Product Description	4
1.1	Model Differences	4
1.2	Device Modifications	4
1.3	EUT Configuration(s)	5
1.4	Test Software	5
1.5	EUT Operating Mode(s)	5
1.6	Configuration	
1.7	Calibration Details of Equipment Used for Measurement	7
1.8	Test Facility	
1.9	Measurement Procedure	
1.10	Laboratory Accreditations and Listings	
1.11	Measurement Uncertainty	8
2.0	EMC Test Regulations/Standards	
3.0	Results of Individual Test	
3.1	Conducted Voltage Emissions of Mains ports	
3.2	Radiated Electric Field Emissions (Below 1 @b)	
3.3	Radiated Electric Field Emissions (Above 1 @lz)	19
APPEND	IX A - Test Setup Photos and Configuration	20
Con	ducted Voltage Emissions of Mains Ports	21
Radi	iated Electric Field Emissions (Below 1 🕮)	22
Radi	iated Electric Field Emissions (Above 1 础)	23
APPEND	IX B – EUT Photographs	24
	External Photographs	
	Internal Photographs	
	el and Location	



Fax: +82-31-624-9501

Certificate No.: CTK-2015-00424 Page (4) / (33) Pages

1.0 General Product Description

No.	ITEM	APPLICATION		
1	Test Sample	Wireless Active Noise Cancelling Headphones		
2	Model	BT 330 NC		
3	Variant Model	-		
4	Dimensions (W x L x H)	154.0 mm × 1	.78.9 mm × 65.0 mm	
5	Mobility	☐ Table-top ☐ Floor-standing ☐ Built-in ☒ Portable		
6	Maximum Clock Frequency	26 MHz		
7	Electrical Ratings	Input: Output: Battery	DC 5 V(USB port of Notebook Computer) - DC 3.7 V Li-ion polymer battery	
8	Test Voltage / Frequency	Voltage: AC 120 V(AC/DC ADAPTOR of Notebook Computer Frequency: 60 Hz		

Model Differences 1.1

Not applicable

Device Modifications 1.2

The following modifications were necessary for compliance:

Not applicable



Fax: +82-31-624-9501

Certificate No.: CTK-2015-00424 Page (5) / (33) Pages

1.3	EUT	Configu	ration((s)
-----	------------	---------	---------	-----

See Appendix A for individual test set-up configuration(s). The following peripheral devices and/or interface cables were connected during the measurement:

Peripheral Devices

[Charging mode through Notebook Computer]

Device	Model No.	Serial No.	Manufacturer
Notebook Computer	NT-R480	Z07093FZ400685L	Samsung Electronics Co., Ltd.
AC/DC ADAPTOR	CPA09-002A	-	Chicony Power Technology Co., Ltd.

[MP3 Plav]

[1 11 0 1 101/]			
Device	Model No.	Serial No.	Manufacturer
Digital Audio Player	N11MT	-	iriver

[Charging mode through Notebook Computer]

	indiging medical and angular companies						
	Fro	om	T	Ö	Type of Cable		
No.	Device	I/O Port	Device	I/O Port	Length (m)	Shielded or Unshielded	Ferrite Core [Y/N]
1	EUT	USB	Notebook Computer	USB	0.5	S	N
2	Notebook Computer	DC IN	AC/DC ADAPTOR	DC OUT	1.2	U	Υ
3	AC/DC ADAPTOR	AC Power	AC Mains	=	1.8	U	N

[MP3 Play]

	From		From To		Type of Cable		
No.	Device	I/O Port	Device	I/O Port	Length (m)	Shielded or Unshielded	Ferrite Core [Y/N]
1	EUT	Micro USB	Digital Audio Player	3.5 Pi	1.0	S	N

^{*} Shielded or Unshielded : Unshielded=U, Shielded=S

	EMC Test V 1.0
	Display Test Patterns - V1.5
	Ping.exe
\boxtimes	Not applicable

EUT Operating Mode(s) 1.5

Equipment under test was operated during the measurement under the following	conditions:

☐ Standby	☐ Scrolling `H'
☐ Color Bar Display	☐ Data Read/Write
☐ USB PLAY	□ DVD Play
☐ USB Data Communication	☐ Serial Data Communication
☐ AUX IN	Charging mode through Notebook Computer
☐ DLNA	MP3 Play

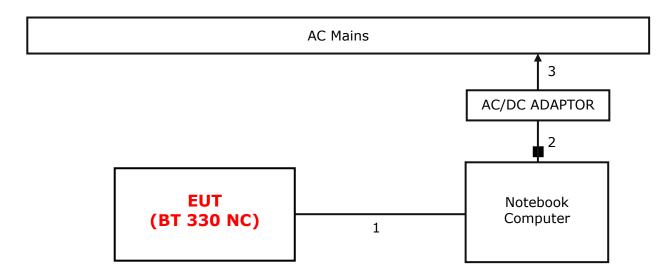


Fax: +82-31-624-9501

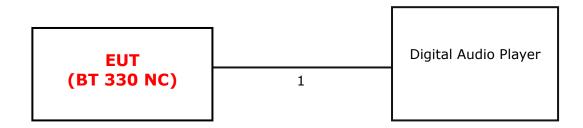
Certificate No.: CTK-2015-00424 Page (6) / (33) Pages

1.6 Configuration

[Charging mode through Notebook Computer]



[MP3 Play]





CTK Co., Ltd.

(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea Tel: +82-31-339-9970

Fax: +82-31-624-9501

Certificate No.: CTK-2015-00424 Page (7) / (33) Pages

1.7 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

1.8 Test Facility

The measurement facility is located at (Ho-dong) 113, Yejik-ro, Cheoin-gu, Yong-in-si, Gyeonggi-do, Korea. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

1.9 Measurement Procedure

Preliminary AC power line conducted emissions tests were performed shielded room. To find worst mode, several typical mode and typical cable position were tested.

Final AC power line conducted emissions test was performed shielded room. (location is same as Preliminary test)

Based on the preliminary tests of the EUT, final test was proceeded worst case test mode and cable configuration.

Preliminary radiated emissions test were performed Semi-Anechoic Chamber or anechoic chamber (Distance of antenna and EUT was 3 m). To find worst mode, several typical mode and typical cable position were tested and peak level and frequency were recorded.

Final radiated emissions test was performed Semi-Anechoic Chamber. Based on the preliminary tests of the EUT, final test was proceeded worst case test mode and cable configuration.

* Measurement procedures was In accordance with ANSI C63.4-2009 7.3.3, 7.3.4, 8.3.1.1, 8.3.1.2, 8.3.2.1, 8.3.2.2

Note #1: Comparing this test result and FCC Part 18 limits, the emission of this product can also meet the FCC Part 18.305 Field Strength Limits and 18.307 Conduction Limits.

Note #2: These results are deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations.



Fax: +82-31-624-9501

Certificate No.: CTK-2015-00424 Page (8) / (33) Pages

1.10 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Registration Number	Logo
USA	FCC	FCC Part 15 & 18 EMI (Electromagnetic Interference / Emission)	805871	
JAPAN	VCCI	VCCI V-3 EMI (Electromagnetic Interference / Emission)	C-986 T-1843 R-3627 G-387	V€I
KOREA	MSIP	EMI (Electromagnetic Interference / Emission) EMS (Electromagnetic Susceptibility / Immunity)	KR0025	

1.11 Measurement Uncertainty

Compliance of the product is based on the measured value.

However, the measurement uncertainty is included for information purposes.

The measurement uncertainties given below are based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

Measurement Type	Frequency Range	Expanded Uncertainty
Conducted Emission	9 kHz to 150 kHz	2.78 dB (C.L.: Approx. 95 %, <i>k</i> =2)
Conducted Emission	150 kHz to 30 MHz	2.70 dB (C.L.: Approx. 95 %, <i>k</i> =2)
Disturbance Power	30 MHz to 300 MHz	3.74 dB (C.L.: Approx. 95 %, <i>k</i> =2)
Radiated Emission	30 MHz to 1000 MHz	3.66 dB (C.L.: Approx. 95 %, <i>k</i> =2)
Radiated Emission	1 GHz Above	4.16 dB (C.L.: Approx. 95 %, <i>k</i> =2)



Certificate No.: CTK-2015-00424 Page (9) / (33) Pages

2.0 **EMC Test Regulations/Standards**

The tests were performed according to following regulations:

Applied standard	Title	Applied	Test Result
FCC Part 15 Subpart B	Conducted Voltage Emissions		
☐ Class A ☐ Class B	Radiated Electric Field Emissions	\boxtimes	



Fax: +82-31-624-9501

Certificate No.: CTK-2015-00424 Page (10) / (33) Pages

Results of Individual Test 3.0

3.1 **Conducted Voltage Emissions of Mains ports**

Test Date

2015-04-06

Test Location

Shielded Room

Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
EMI Test Receiver	ESCI3	Rohde & Schwarz	100032	2016-02-02	
LISN	ENV216	Rohde & Schwarz	101235	2015-07-30	
LISN	ENV216	Rohde & Schwarz	101236	2015-07-30	
EMI Test Receiver	ESR7	Rohde & Schwarz	101088	2015-07-29	
LISN	ENV216	Rohde & Schwarz	101151	2015-11-07	
LISN	ESH3-Z5	Rohde & Schwarz	100207	2015-11-07	
EMI Test Receiver	ESCI7	Rohde & Schwarz	100816	2015-12-05	
LISN	ENV216	Rohde & Schwarz	101760	2016-02-02	\boxtimes
LISN	NNLK 8121	SCHWARZBECK	8121-644	2015-08-21	
LISN	ENV216	Rohde & Schwarz	101150	2016-02-02	

Test Software

ESCI7, ESCI3: EMC32 Ver. 8.50.0

ESR7: EMC32 Ver. 8.53.0

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Setting

IF Band Width: 9 klb

Climate Condition

Temperature: (22 ± 1) ℃ $(39 \pm 1) \%$ Relative Humidity:

Atmospheric Pressure: 99 kPa



Fax: +82-31-624-9501

Certificate No.: CTK-2015-00424 Page (11) / (33) Pages

Test R	esu	lt
--------	-----	----

The requirements are: ${\mathbb Q}$	$ imes$ MET $\;\; lue{}\;\;$	NOT MET
-------------------------------------	------------------------------	---------

[Charging mode through Notebook Computer]

Frequency (∰z)	Measured Data (dBμV)	Margin (dB)	Remark
0.199 500	57.7	5.9	Quasi-peak

The Result is calculated by using the following formula;

- * Result = Limit Margin (Result included the correction factor)
- * Correction factor = Cable Loss + Insertion loss of LISN



Certificate No.: CTK-2015-00424 Page (12) / (33) Pages

Test Data

[Charging mode through Notebook Computer] [Line: L1]

Test 1/2

Test Report

Common Information

Test Model Name: BT 330 NC Test Mode:

Notebook Charging Mode Cresyn Co., Ltd. JANG, BONG JUN Manufacturer: Tester:

Hardware Setup: EMI conducted\Voltage with ENV216_FO(101760) - [EMI conducted]

Subrange 1

150 kHz - 30 MHz Frequency Range:

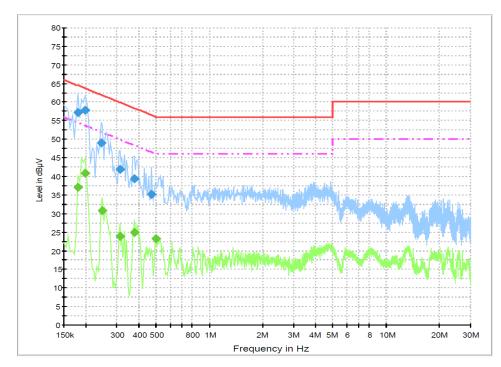
ESCI 7 [ESCI 7] Receiver:

Signal Path:

LISN:

@ GPIB0 (ADR 23), SN 100816/007, FW 4.42 ESCI 7-ENV216 FO(101760) Correction Table: 3-2 CE Cable Loss ENV216 FO(101760) Correction Table (Line 0): ENV216_FO_N(101760) Correction Table (Line 1): ENV216_FO_L1(101760)

CISPR 22 Class B L1



4/6/2015 5:48:45



Fax: +82-31-624-9501

Certificate No.: CTK-2015-00424 Page (13) / (33) Pages

2/2 Test

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.181500	57.1	1000.0	9.000	On	L1	9.8	7.3	64.4
0.199500	57.7	1000.0	9.000	On	L1	9.8	5.9	63.6
0.244500	48.9	1000.0	9.000	On	L1	9.6	13.0	61.9
0.312000	41.9	1000.0	9.000	On	L1	9.7	18.0	59.9
0.375000	39.4	1000.0	9.000	On	L1	9.9	19.0	58.4
0.469500	35.2	1000.0	9.000	On	L1	9.9	21.3	56.5

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.181500	37.0	1000.0	9.000	On	L1	9.8	17.4	54.4
0.199500	40.9	1000.0	9.000	On	L1	9.8	12.8	53.6
0.249000	30.8	1000.0	9.000	On	L1	9.6	21.0	51.8
0.312000	23.8	1000.0	9.000	On	L1	9.7	26.1	49.9
0.375000	25.0	1000.0	9.000	On	L1	9.9	23.4	48.4
0.496500	23.3	1000.0	9.000	On	L1	9.9	22.7	46.1

4/6/2015 5:48:45



Fax: +82-31-624-9501

Certificate No.: CTK-2015-00424 Page (14) / (33) Pages

[Charging mode through Notebook Computer] [Line: Neutral]

Test 1/2

Test Report

Common Information

BT 330 NC Test Model Name:

Test Mode: Notebook Charging Mode Cresyn Co., Ltd. JANG, BONG JUN Manufacturer: Tester:

Hardware Setup: EMI conducted\Voltage with ENV216_FO(101760) - [EMI conducted]

150 kHz - 30 MHz Frequency Range:

Receiver:

ESCI 7 [ESCI 7] @ GPIB0 (ADR 23), SN 100816/007, FW 4.42 ESCI 7-ENV216 FO(101760)

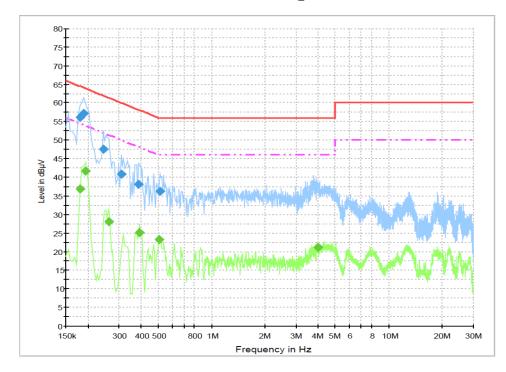
Signal Path:

Correction Table: 3-2 CE Cable Loss

LISN: ENV216 FO(101760)

Correction Table (Line 0): ENV216_FO_N(101760)
Correction Table (Line 1): ENV216_FO_L1(101760)

CISPR 22 Class B_N



4/6/2015 5:54:23



Fax: +82-31-624-9501

Certificate No.: CTK-2015-00424 Page (15) / (33) Pages

2/2 Test

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.181500	56.1	1000.0	9.000	On	N	9.8	8.3	64.4
0.190500	57.2	1000.0	9.000	On	N	9.8	6.8	64.0
0.244500	47.6	1000.0	9.000	On	N	9.6	14.4	61.9
0.307500	40.8	1000.0	9.000	On	N	9.7	19.2	60.0
0.384000	38.1	1000.0	9.000	On	N	9.9	20.1	58.2
0.510000	36.3	1000.0	9.000	On	N	9.9	19.7	56.0

Final Result 2

i iiidi itesait z								
Frequency	CAverage	Meas.	Bandwidth	Filter	Line	Corr.	Margin	Limit
(MHz)	(dBµV)	Time	(kHz)			(dB)	(dB)	(dBµV)
		(ms)						
0.181500	37.0	1000.0	9.000	On	N	9.8	17.5	54.4
0.195000	41.6	1000.0	9.000	On	N	9.8	12.2	53.8
0.262500	28.0	1000.0	9.000	On	N	9.6	23.3	51.4
0.388500	25.1	1000.0	9.000	On	N	9.9	23.0	48.1
0.505500	23.2	1000.0	9.000	On	N	9.9	22.8	46.0
3.997500	21.1	1000.0	9.000	On	N	9.7	24.9	46.0

4/6/2015 5:54:23



Fax: +82-31-624-9501

Certificate No.: CTK-2015-00424 Page (16) / (33) Pages

Radiated Electric Field Emissions (Below 1 础) 3.2

Test Date

2015-03-25

Test Location

10 m SAC (test distance : \square 10 m, \boxtimes 3 m)

Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
EMI Test Receiver	ESCI7	Rohde & Schwarz	100814	2015-12-05	\boxtimes
Bilog Antenna	CBL6111C	Schaffner	2551	2016-05-08	
6dB Attenuator	DNF	Rohde & Schwarz	272.4110.50-2	2015-11-07	\square
Amplifier	310	Sonoma Instrument Co.	291721	2016-02-02	\boxtimes

Test Software

TOYO EMI software Ver. 5.1.0

Frequency Range of Measurement

30 Mz to 1 GHz

Instrument Setting

IF Band Width: 120 klb

Climate Condition

Temperature: (21 ± 1) ℃ Relative Humidity: $(40 \pm 1) \%$ Atmospheric Pressure: 99 kPa

Test Result

The requirements are: ☐ MET ☐ NOT MET

[Charging mode through Notebook Computer]

Frequency (Mb)	Measured Data (dBμV/m)	Margin (dB)	Remark
267.044	33.3	12.7	Quasi-peak

[MP3 Play]

Frequency (灿z)	Measured Data (dBμV/m)	Margin (dB)	Remark
302.934	27.8	18.2	Quasi-peak

The Result is calculated by using the following formula;

^{*} Result = Reading + Correction factor

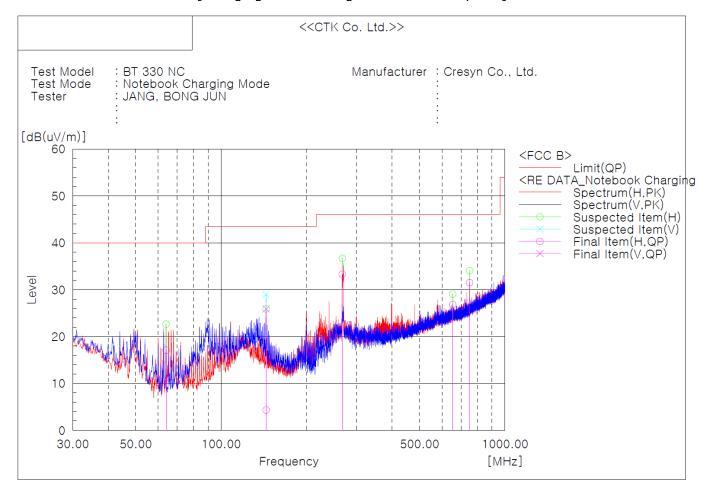
^{*} Correction factor = Antenna Factor + Cable Loss + 6 dB attenuator - Amp Gain



Certificate No.: CTK-2015-00424 Page (17) / (33) Pages

Test Data

[Charging mode through Notebook Computer]



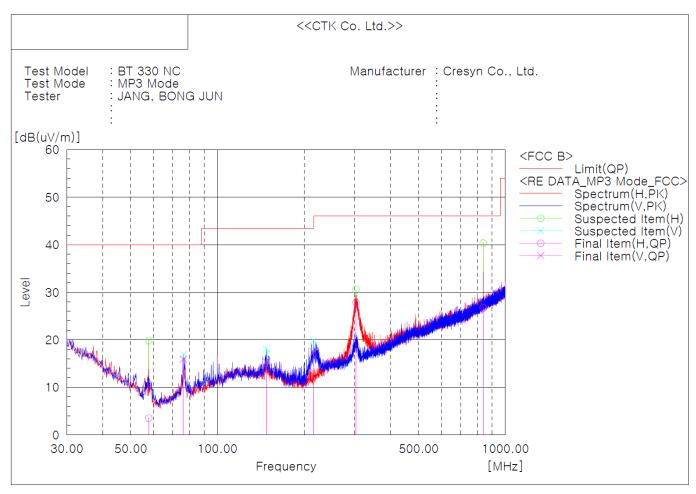
Final Result

No.	Frequency	(P)	Reading QP	c.f	Result QP	Limit QP	Margin QP	Height	Angle
	[MHz]		[dB(uV)]	[dB(1/m)]	[dB(uV/m)]	[dB(uV/m)]	[dB]	[cm]	[deg]
1	63.950	Н	35.7	-18.6	17.1	40.0	22.9	305.0	237.0
2	143.975	V	38.2	-12.3	25.9	43.5	17.6	100.0	49.0
3	143.975	Н	16.6	-12.3	4.3	43.5	39.2	305.0	200.0
4	267.044	Η	43.2	-9.9	33.3	46.0	12.7	100.0	311.0
5	654.195	Η	26.9	-0.1	26.8	46.0	19.2	400.0	0.0
6	749.983	Н	30.1	1.4	31.5	46.0	14.5	100.0	311.0



Certificate No.: CTK-2015-00424 Page (18) / (33) Pages

[MP3 Play]



Final Result

No.	Frequency	(P)	Reading QP	c.f	Result QP	Limit QP	Margin QP	Height	Angle
	[MHz]		[dB(uV)]	[dB(1/m)]	[dB(uV/m)]	[dB(uV/m)]	[dB]	[cm]	[deg]
1	57.766	Η	22.0	-18.5	3.5	40.0	36.5	208.0	124.0
2	76.196	V	33.0	-17.1	15.9	40.0	24.1	100.0	123.0
3	148.219	V	27.7	-12.4	15.3	43.5	28.2	100.0	49.0
4	215.755	V	30.6	-13.2	17.4	43.5	26.1	100.0	49.0
5	302.934	Н	36.7	-8.9	27.8	46.0	18.2	100.0	200.0
6	838.374	Н	23.3	3.4	26.7	46.0	19.3	100.0	312.0



Fax: +82-31-624-9501

Certificate No.: CTK-2015-00424 Page (19) / (33) Pages

Radiated Electric Field Emissions (Above 1 础) 3.3

Test Date Not Applicable

Test Location

3 m SAC

Test Equipment

Name of Equipment	Model No.	Manufacturer	Serial No.	Due Date	Applied
EMI Test Receiver	ESCI7	Rohde & Schwarz	100816	2015-12-05	
Double Ridged Guide Antenna	3117	ETS-Lindgren	154525	2015-07-03	
Preamplifier	8449B	Agilent Technologies	3008A02307	2015-12-26	

Test Software

TOYO EMI software Ver. 5.1.0

Frequency Range of Measurement

1 GHz to 6 GHz

Instrument Setting

IF Band Width: 1 MHz

Climate Condition

Temperature: Relative Humidity: Atmospheric Pressure:

Test Result

The requirements are: $\;\square\;$ ME	ET 🗌 NOT MET
--	--------------

Frequency (ﷺ)	Measured Data (dBμV/m)	Margin (dB)	Remark
·			

The Result is calculated by using the following formula;

Test Data

^{*} Result = Reading + Correction factor

^{*} Correction factor = Antenna Factor + Cable Loss - Amp Gain



Certificate No.: CTK-2015-00424 Page (20) / (33) Pages

APPENDIX A - Test Setup Photos and Configuration



Certificate No.: CTK-2015-00424 Page (21) / (33) Pages

Conducted Voltage Emissions of Mains Ports



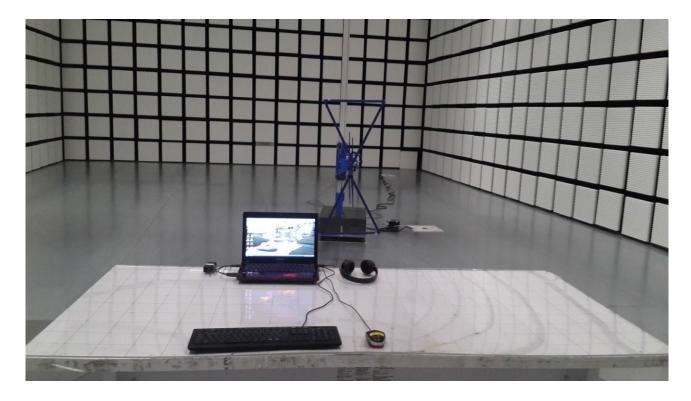


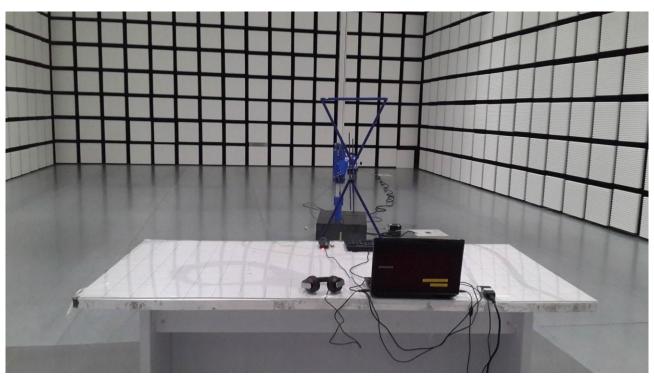


Fax: +82-31-624-9501

Certificate No.: CTK-2015-00424 Page (22) / (33) Pages

Radiated Electric Field Emissions (Below 1 础)







Fax: +82-31-624-9501

Certificate No.: CTK-2015-00424 Page (23) / (33) Pages

Radiated Electric Field Emissions (Above 1 础)

Not Applicable



Fax: +82-31-624-9501

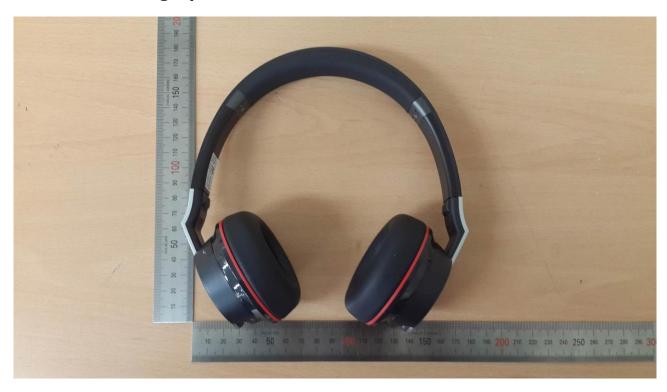
Certificate No.: CTK-2015-00424 Page (24) / (33) Pages

APPENDIX B – EUT Photographs



Certificate No.: CTK-2015-00424 Page (25) / (33) Pages

EUT External Photographs







Certificate No.: CTK-2015-00424 Page (26) / (33) Pages

EUT Internal Photographs

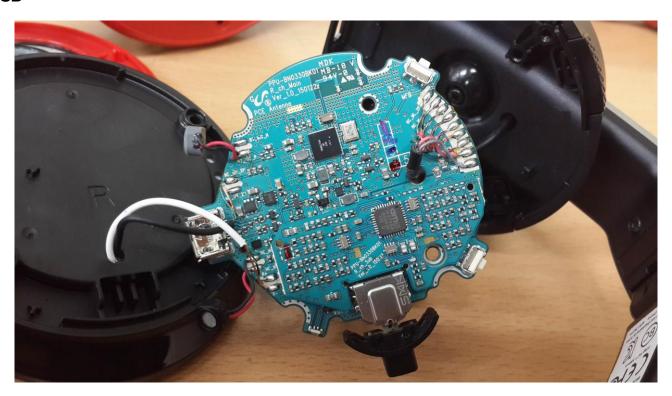


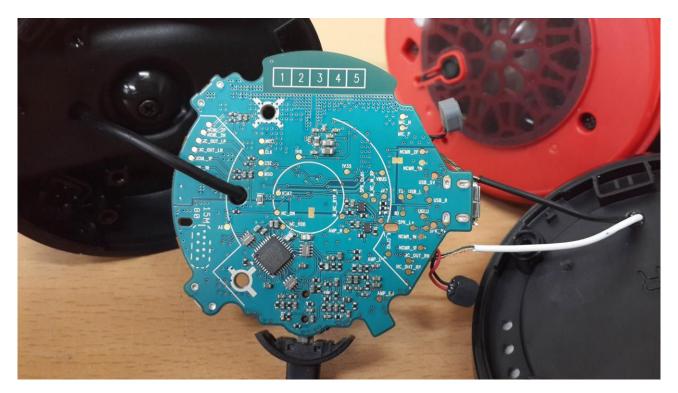




Certificate No.: CTK-2015-00424 Page (27) / (33) Pages

PCB







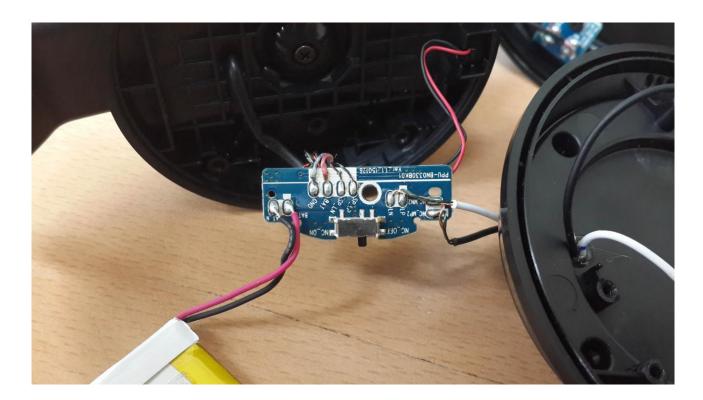
Certificate No.: CTK-2015-00424 Page (28) / (33) Pages

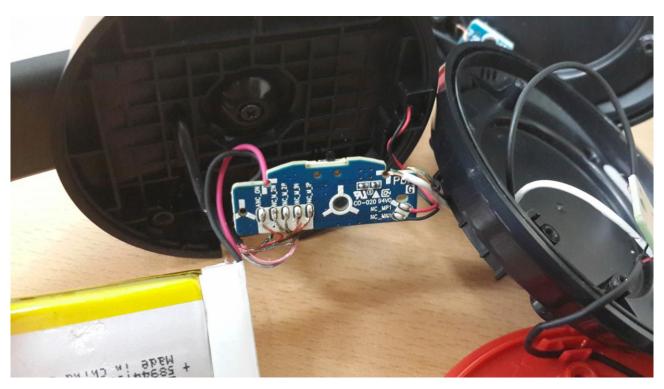






Certificate No.: CTK-2015-00424 Page (29) / (33) Pages







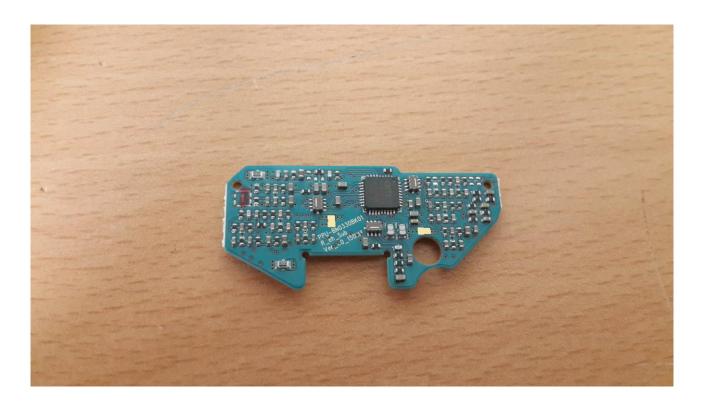
Certificate No.: CTK-2015-00424 Page (30) / (33) Pages

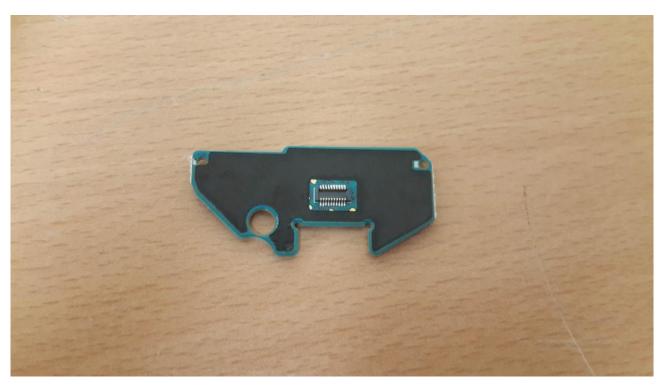






Certificate No.: CTK-2015-00424 Page (31) / (33) Pages







Certificate No.: CTK-2015-00424 Page (32) / (33) Pages







Certificate No.: CTK-2015-00424 Page (33) / (33) Pages

Label and Location



